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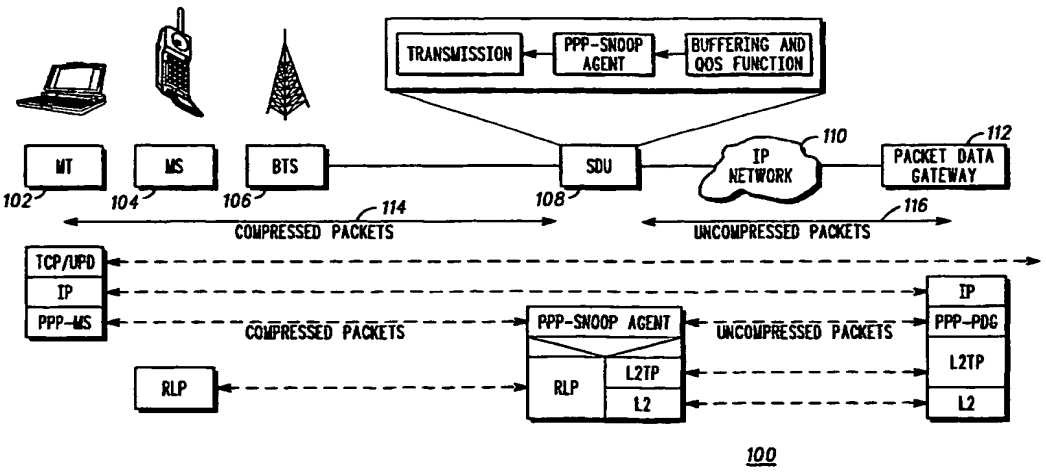
(54) Title: METHOD FOR ESTABLISHING COMMUNICATION IN A PACKET NETWORK



(57) Abstract: The present invention provides a method for establishing communication between a mobile station (104) and a packet data gateway (112) in a point-to-point connection. The packet network includes a selection distribution unit (108) interposed between the mobile station (104) and the packet data gateway (112). A compressed data packet is sent from the mobile station (104) to a selection distribution unit (108). The compressed data packet is uncompressed at the selection distribution unit (108) to produce an uncompressed data packet. The uncompressed data packet is sent from the selection distribution unit (108) to the packet data gateway (112).

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METHOD FOR ESTABLISHING COMMUNICATION IN A PACKET NETWORK

Related Applications

The following applications are related to this application and are filed on the date herewith. The disclosure of each of these related applications is incorporated by reference: S/N (Docket Number CE08072R) titled "METHOD FOR CHANGING COMMUNICATION IN A COMMUNICATION SYSTEM, AND COMMUNICATION SYSTEM THEREFOR"; S/N (Docket Number CE08193R) titled "SESSION BASED BILLING IN A COMMUNICATION SYSTEM"; S/N (Docket Number CE08135R) titled "METHOD FOR RETRANSMITTING A DATA PACKET IN A PACKET NETWORK"; S/N (Docket Number CE08170R) titled "COMMUNICATION NETWORK METHOD AND APPARATUS"; S/N (Docket Number CE08169R titled "METHOD AND SYSTEM FOR PROCESSING INTELLIGENT NETWORK COMMANDS IN A COMMUNICATIONS NETWORK"; S/N (Docket Number CE08182R titled "METHOD AND SYSTEM FOR NETWORK SERVICE NEGOTIATION IN A TELECOMMUNICATIONS SYSTEM"; S/N (Docket Number CE08186R) titled "METHOD AND APPARATUS FOR ROUTING PACKET DATA IN A COMMUNICATIONS SYSTEM"; S/N (Docket Number CE08190R titled "METHOD AND SYSTEM FOR INTRODUCING NEW SERVICES INTO A NETWORK".

Field of the Invention

The invention relates generally to communication systems, and more particularly to a method and communication system for establishing communication between a mobile station and a packet data gateway.

Background of the Invention

Point-to-Point (PPP) protocol has been proposed for connecting mobile users to Internet Service Providers (ISPs) in 3G cellular networks. The PPP connection in most cases spans the low-bandwidth air-interface link and a high bandwidth link that connects the Selection Distribution Unit (SDU) to a Packet Data Gateway (PDG). The air interface is typically an interface that experiences higher levels of loss.

Use of compression protocols, which are necessary for improving performance over the low-bandwidth air interface links leads to issues of hiding the IP header from the SDU. This leads to the disablement of the SDU to prioritize traffic and perform other Quality of Service (QoS) functions, such as the resequencing of packets.

Two problems associated with PPP compression schemes are the inability to do any per packet QoS in the Radio Access Network (RAN) and the performance penalty due to packet loss.

In the downlink direction, packets arriving at the SDU are compressed, and consequently the IP header and the Layer 4 headers are not visible to the SDU. Hence, the Type of Service (TOS) byte information in the IP header cannot be used by the SDU to perform any per packet QoS functionality, such as classifying the packets into different queues and using different queue service disciplines. The same holds for packets in the uplink direction arriving at a mobile station. Further, such schemes can lead to the dropping of packets, which leads to problems in synchronization.

If packets are lost, there is a performance penalty. Using delta compression schemes such as Van Jacobson header compression, packets that are received out of order lead to performance problems, as a resynchronization procedure has

to occur. Studies have shown that the loss of a single packet can lead to up to 13 additional PPP frames being sent. This results in the wasting of expensive air-interface bandwidth.

Thus, a need exists for a method for establishing communication in a packet network.

Brief Description of the Drawings

FIG. 1 depicts a communication system in accordance with the preferred embodiment of the present invention;

FIG. 2 depicts a ladder diagram of data compression of a header that is initiated by the packet data gateway in accordance with the preferred embodiment of the present invention;

FIG. 3 depicts a ladder diagram of data compression of a header that is initiated by the selection distribution unit in accordance with the preferred embodiment of the present invention;

FIG. 4 depicts a ladder diagram of data compression of a header that is initiated by the mobile station in accordance with the preferred embodiment of the present invention;

FIG. 5 depicts a ladder diagram of data compression of data packets that is initiated by the packet data gateway in accordance with the preferred embodiment of the present invention;

FIG. 6 depicts a ladder diagram of data compression of data packets that is initiated by the selection distribution unit in accordance with the preferred embodiment of the present invention; and

FIG. 7 depicts a ladder diagram of data compression of data packets that is initiated by the mobile station in

accordance with the preferred embodiment of the present invention.

Detailed Description of a Preferred Embodiment

The present invention provides a method for establishing communication in a packet network. A compressed data packet is sent from a mobile station to a selection distribution unit. The compressed data packet is uncompresses at the selection distribution unit to produce an uncompressed data packet. The uncompressed data packet is sent from the selection distribution unit to the packet data gateway.

The present invention can be better understood with reference to FIGs. 1-7. Referring now to FIG. 1, a communication system 100 is depicted in accordance with the preferred embodiment of the present invention. Communication system 100 is preferably a point-to-point packet network, such as a network that communicates via the Internet Protocol (IP). Communication system 100 could alternately be any packet-based network that communicates via endpoints via a plurality of packets. Referring to FIG. 1, acronyms are used for convenience. The following is a list of the acronyms used in FIG. 1:

BTS	Base Transceiver Station
IP	Internet Protocol
IPCP	Internet Protocol Control Protocol
LCP	Link Control Protocol
MS	Mobile Station
MT	Mobile Terminal
NCP	Network Control Protocol
PDG	Packet Data Gateway

PPP Point to Point Protocol
SDU Selection Distribution Unit
TCP Transmission Control Protocol

Communication system 100 is effective in transporting data packets and includes a packet data gateway 112 that is capable of sending and receiving compressed data packets 114 and uncompressed data packets 116. Communication system 100 also includes a selection distribution unit 108 coupled to packet data gateway 112. Selection distribution unit 108 is capable of receiving compressed data packets 114 and uncompressed data packets 116 from packet data gateway 112. Selection distribution unit 108 is capable of determining that a compressed data packet 114 sent from the packet data gateway has been received in error. Selection distribution unit 108 is effective in receiving uncompressed data packets 116 from packet data gateway 112 via IP network 110 and compressing uncompressed data packets 116 and sending the resulting compressed data packets 114 to mobile station 104 in communication with communication system 100. Selection distribution unit 108 is also preferably effective in receiving compressed data packets 114 from mobile station 104 in communication with communication system 100 and uncompressing compressed data packets 114 and sending the resulting uncompressed data packets 116 to packet data gateway 112.

Communication system 100 can also include a mobile terminal (MT) 102, a mobile station 104, and a base transceiver station 106. Communication system 100 also preferably includes an IP network 110 located between selection distribution unit 108 and packet data gateway 112. Packet data gateway 112 is preferably responsible for compressing headers for the link to mobile terminal 116. Mobile terminal 102 is preferably a TCP receiver.

FIG. 2 depicts a ladder diagram 200 of data compression of a header that is initiated by the packet data gateway in accordance with the preferred embodiment of the present invention. FIG. 2 relates to a preferred method for performing header compression when proposed by packet data gateway 112.

Mobile station 104 and packet data gateway 112 send link establishment messages 201. Such link establishment messages 201 are preferably transferred using the Link Control Protocol, although other suitable protocols can also be used. Packet data gateway 112 then sends a header compression message 203 to mobile station 104 via selection distribution unit 108. Header compression message 203 can be sent using the Network Control Protocol (NCP), IP Control Protocol (IPCP), or any other suitable protocol. Message 203 may also be used to negotiate other control parameters along with header compression negotiation. Mobile station 104 then sends an accept header compression message 205. The accept header compression message 205 is intended for packet data gateway 112 via selection distribution unit 108. Message 205 is sent in response to message 203 and thus, may be an NCP message containing other information and parameters that are being negotiated. Selection distribution unit 108 intercepts (207) accept header compression message 205.

Selection distribution unit 108 intercepts accept header compression message 205 so that mobile station 104 will send compressed headers to selection distribution unit 108, but headers sent to and from packet data gateway 112 are not compressed. In this manner, protocol headers are available in uncompressed form at the selection distribution unit 108 so that it may utilize the information contained therein for the purposes of assuring optimum Quality of Service. Selection distribution unit 108 then sends a deny

header compression message 209 to packet data gateway 112. Message 209 may contain other information and parameters that are being negotiated. In this example, selection distribution unit 108 only alters the header compression part of the negotiation between the mobile station 104 and packet data gateway 112.

Mobile station 104 then sends a compressed header 211 intended for packet data gateway 112. Compressed header 211 is received by selection distribution unit 108, which uncompresses compressed header (213). Selection distribution unit 108 then sends a packet 215 with this uncompressed header to packet data gateway 112.

Packet data gateway 112 responds, in time, with uncompressed header 217 intended for mobile station 104. This message is received by selection distribution unit 108, which compresses (219) uncompressed header 217 for transmission to mobile station 104. Selection distribution unit 108 then sends a packet 221 that includes the compressed header to mobile station 104.

In this manner, communication is established between mobile station 104 and packet data gateway 112. Mobile station 104 and packet data gateway 112 treat the messages sent therebetween as compressed messages after establishing header compression. However, using the preferred embodiment of the present invention as depicted in FIG. 2, selection distribution unit 108 intercepts the acceptance of header compression message sent from mobile station 104. In this manner, mobile station 104 treats the communication as a compressed header session, while packet data gateway 112 treats the communication as one using uncompressed headers, since packet data gateway 112 never receives the acceptance message sent from mobile station 104 but intercepted by selection distribution unit 108.

FIG. 3 depicts a ladder diagram 300 of data compression of a header that is initiated by the selection distribution unit in accordance with the preferred embodiment of the present invention. FIG. 3 relates to a preferred method for performing header compression when proposed by selection distribution unit 108.

Mobile station 104 and packet data gateway 112 send link establishment messages 301. Such link establishment messages 301 are preferably transferred using the Link Control Protocol, although other suitable protocols can also be used. Packet data gateway 112 then sends a no header compression message 303 to selection distribution unit 108. No header compression message 303 can be sent using the Network Control Protocol (NCP), IP Control Protocol (IPCP), or any other suitable protocol. In addition to header compression negotiation, such messages may contain other information and parameters that are being negotiated between the mobile station 104 and packet data gateway 112. Selection distribution unit 108 intercepts message 303 and indicates (305) to mobile station 104 via header compression message 307 that mobile header compression is requested. Mobile station 104 then sends an accept header compression message 309. This message is intercepted by selection distribution unit 108, which in turn sends a no header compression message 311 to packet data gateway 112. Selection distribution unit 108 intercepts accept header compression message 309 so that mobile station 104 will send and receive compressed headers to and from selection distribution unit 108, but headers sent to and from packet data gateway 112 are not compressed.

Mobile station 104 then sends a packet 313 with a compressed header intended for packet data gateway 112. Compressed header 313 is received by selection distribution unit 108, which uncompresses (315) compressed header 313.

Selection distribution unit 108 then sends a packet 317 with this uncompressed header to packet data gateway 112.

Packet data gateway 112 responds, in time, with uncompressed header 319 intended for mobile station 104. This message is received by selection distribution unit 108, which compresses (321) uncompressed header 319 for transmission to mobile station 104. Selection distribution unit 108 then sends a packet 323 that includes the compressed header to mobile station 104.

In this manner, communication is established between mobile station 104 and packet data gateway 112. Mobile station 104 and packet data gateway 112 treat the messages sent therebetween as compressed messages after establishing header compression. However, using the preferred embodiment of the present invention as depicted in FIG. 3, selection distribution unit 108 intercepts the acceptance of header compression message sent from mobile station 104. In this manner, mobile station 104 treats the communication as a compressed header session, while packet data gateway 112 treats the communication as one using uncompressed headers, since packet data gateway 112 never receives the acceptance message sent from mobile station 104 but intercepted by selection distribution unit 108.

FIG. 4 depicts a ladder diagram 400 of data compression of a header that is initiated by the mobile station in accordance with the preferred embodiment of the present invention. FIG. 4 relates to a preferred method for performing header compression when proposed by selection mobile station 104.

Mobile station 104 and packet data gateway 112 send link establishment messages 401. Such link establishment messages 401 are preferably transferred using the Link Control Protocol, although other suitable protocols can also

be used. Mobile station 104 then sends requests header compression via message 403 to selection distribution unit 108. Header compression request message 403 can be part of the Network Control Protocol (NCP), IP Control Protocol (IPCP), or any other suitable protocol message. Selection distribution unit 108 intercepts message 403 and indicates (405) to packet data gateway 112 via message 407 that header compression is not requested. Packet data gateway 112 sends an acknowledgment in message 409 to the mobile station 104. This message is intercepted by selection distribution unit 108, which in turn sends message 411 accepting header compression to mobile station 104. Thus, selection distribution unit 108 ensures that mobile station 104 will send and receive compressed headers to and from selection distribution unit 108, but headers sent to and from packet data gateway 112 are not compressed.

Mobile station 104 then sends a packet 413 with a compressed header intended for packet data gateway 112. Compressed header 413 is received by selection distribution unit 108, which uncompresses (415) compressed header 413. Selection distribution unit 108 then sends a packet 417 with this uncompressed header to packet data gateway 112.

Packet data gateway 112 responds, in time, with uncompressed header 419 intended for mobile station 104. This message is received by selection distribution unit 108, which compresses (421) uncompressed header 419 for transmission to mobile station 104. Selection distribution unit 108 then sends a packet 423 that includes the compressed header to mobile station 104.

In this manner, communication is established between mobile station 104 and packet data gateway 112. Mobile station 104 and packet data gateway 112 treat the messages sent therebetween as compressed messages after establishing header compression. However, using the preferred embodiment

of the present invention as depicted in FIG. 4, selection distribution unit 108 intercepts the request for header compression message sent from mobile station 104 and accepts header compression on behalf of the packet data gateway 112. In this manner, mobile station 104 treats the communication as a compressed header session, while packet data gateway 112 treats the communication as one using uncompressed headers, since packet data gateway 112 never receives the request for header compression message sent from mobile station 104.

FIG. 5 depicts a ladder diagram 500 of data compression of a payload that is initiated by the packet data gateway in accordance with the preferred embodiment of the present invention. FIG. 5 relates to a preferred method for performing payload compression when proposed by packet data gateway 112.

Mobile station 104 and packet data gateway 112 send link establishment messages 501. Such link establishment messages 501 are preferably transferred using the Link Control Protocol, although other suitable protocols can also be used. Packet data gateway 112 and the mobile station 104 perform network layer configuration via messages 503 using the Network Control Protocol (NCP), IP Control Protocol (IPCP), or any other suitable protocol. Packet data gateway 112 then sends a payload compression request in message 505 to mobile station 104 via selection distribution unit 108. Payload compression request in message 505 can be sent using the Compression Control Protocol (CCP), or any other suitable protocol. Mobile station 104 then sends an accept payload compression message 507. The accept payload compression message 507 is intended for packet data gateway 112 via selection distribution unit 108. Selection

distribution unit 108 intercepts (509) accept payload compression message 507.

Selection distribution unit 108 intercepts accept payload compression message 507 so that mobile station 104 will send compressed payloads to selection distribution unit 108, but payloads sent to and from packet data gateway 112 are not compressed. In this manner, payload information is available in uncompressed form at the selection distribution unit 108 so that it may utilize the information contained therein for the purposes of assuring optimum Quality of Service. Selection distribution unit 108 is also able to select the optimum method of compression best suited for the radio frequency channels. Selection distribution unit 108 then sends a deny payload compression message 511 to packet data gateway 112.

Mobile station 104 then sends a compressed payload 513 intended for packet data gateway 112. Compressed payload 513 is received by selection distribution unit 108, which uncompresses compressed payload (515). Selection distribution unit 108 then sends a packet 517 with this uncompressed payload to packet data gateway 112.

Packet data gateway 112 responds, in time, with uncompressed payload 519 intended for mobile station 104. This message is received by selection distribution unit 108, which compresses (521) uncompressed payload 519 for transmission to mobile station 104. Selection distribution unit 108 then sends a packet 523 that includes the compressed payload to mobile station 104.

In this manner, communication is established between mobile station 104 and packet data gateway 112. Mobile station 104 and packet data gateway 112 treat the messages sent therebetween as compressed messages after establishing payload compression. However, using the preferred embodiment of the present invention as depicted in FIG. 5,

selection distribution unit 108 intercepts the acceptance of payload compression message sent from mobile station 104. In this manner, mobile station 104 treats the communication as a compressed payload session, while packet data gateway 112 treats the communication as one using uncompressed payloads, since packet data gateway 112 never receives the acceptance message sent from mobile station 104 but intercepted by selection distribution unit 108.

FIG. 6 depicts a ladder diagram 600 of data compression of a payload that is initiated by the selection distribution unit in accordance with the preferred embodiment of the present invention. FIG. 6 relates to a preferred method for performing payload compression when proposed by selection distribution unit 108.

Mobile station 104 and packet data gateway 112 send link establishment messages 601. Such link establishment messages 601 are preferably transferred using the Link Control Protocol, although other suitable protocols can also be used. Packet data gateway 112 and the mobile station 104 perform network layer configuration via messages 603 using the Network Control Protocol (NCP), IP Control Protocol (IPCP), or any other suitable protocol. Selection distribution unit 108 then sends a request for compression message 605 using Compression Control protocol (CCP) to mobile unit 104. Mobile unit 104 responds to this request with message 607 and the selection distribution unit 108 does not forward the response to the packet data gateway 112. In this manner, selection distribution unit 108 negotiates payload compression independent of the packet data gateway 112 so that mobile station 104 will send and receive compressed payloads to and from selection distribution unit 108, but payloads sent to and from packet data gateway 112 are not compressed.

Mobile station 104 then sends a packet 609 with a compressed payload intended for packet data gateway 112. Compressed payload 609 is received by selection distribution unit 108, which uncompresses (611) compressed payload 609. Selection distribution unit 108 then sends a packet 613 with this uncompressed payload to packet data gateway 112.

Packet data gateway 112 sends, in time, packet with uncompressed payload 615 intended for mobile station 104. This message is received by selection distribution unit 108, which compresses (617) uncompressed payload 615 for transmission to mobile station 104. Selection distribution unit 108 then sends a packet 619 that includes the compressed payload to mobile station 104.

In this manner, communication is established between mobile station 104 and packet data gateway 112. Mobile station 104 and packet data gateway 112 treat the messages sent therebetween as compressed messages after establishing payload compression. However, using the preferred embodiment of the present invention as depicted in FIG. 6, selection distribution unit 108 intercepts the acceptance of payload compression message sent from mobile station 104. In this manner, mobile station 104 treats the communication as a compressed payload session, while packet data gateway 112 treats the communication as one using uncompressed payloads, since packet data gateway 112 never expects or receives the acceptance message sent from mobile station 104 but intercepted by selection distribution unit 108. If the packet data gateway 112 attempts payload compression negotiation, selection distribution unit 108 will intercept and deny payload compression.

FIG. 7 depicts a ladder diagram 700 of data compression of payload that is initiated by the mobile station in accordance with the preferred embodiment of the present

invention. FIG. 7 relates to a preferred method for performing payload compression when proposed by selection mobile station 104.

Mobile station 104 and packet data gateway 112 send link establishment messages 701. Such link establishment messages 701 are preferably transferred using the Link Control Protocol, although other suitable protocols can also be used. Packet data gateway 112 and the mobile station 104 perform network layer configuration via messages 703 using the Network Control Protocol (NCP), IP Control Protocol (IPCP), or any other suitable protocol. Mobile station 104 then sends requests payload compression via message 705 to packet data gateway 112. Payload compression request message 705 can be part of the Compression Control Protocol (CCP), or any other suitable protocol message. Selection distribution unit 108 intercepts message 705 and does not forward (707) it to packet data gateway 112. Selection distribution unit 108, in turn, sends message 709 accepting payload compression to mobile station 104. Thus, selection distribution unit 108 ensures that mobile station 104 will send and receive compressed payloads to and from selection distribution unit 108, but payloads sent to and from packet data gateway 112 are not compressed.

Mobile station 104 then sends a packet 711 with a compressed payload intended for packet data gateway 112. Compressed payload 711 is received by selection distribution unit 108, which uncompresses (713) compressed payload 711. Selection distribution unit 108 then sends a packet 715 with this uncompressed payload to packet data gateway 112.

Packet data gateway 112 sends a packet with uncompressed payload 717 intended for mobile station 104. This message is received by selection distribution unit 108, which compresses (719) uncompressed payload 717 for transmission to mobile station 104. Selection distribution

unit 108 then sends a packet 721 that includes the compressed payload to mobile station 104.

In this manner, communication is established between mobile station 104 and packet data gateway 112. Mobile station 104 and packet data gateway 112 treat the messages sent therebetween as compressed messages after establishing payload compression. However, using the preferred embodiment of the present invention as depicted in FIG. 7, selection distribution unit 108 intercepts the request for payload compression message sent from mobile station 104 and accepts payload compression on behalf of the packet data gateway 112. In this manner, mobile station 104 treats the communication as a compressed payload session, while packet data gateway 112 treats the communication as one using uncompressed payloads, since packet data gateway 112 never receives the request for payload compression message sent from mobile station 104.

The present invention therefore provides a method for establishing communication between a mobile station and a packet data gateway in a point-to-point connection. The present invention provides the ability to provide Quality of Service differentiation based on IP Type of Service without modifying current architectures. A selection distribution unit can resequence packets for a PPP connection. This resequencing allows the selection distribution unit to transmit higher priority packets before lower priority packets. Further, the present invention provides the ability for the selection distribution unit to use different Radio Link Protocol modes depending upon the type of header.

While this invention has been described in terms of certain examples thereof, it is not intended that it be

limited to the above description, but rather only to the extent set forth in the claims that follow.

We claim:

Claims

1. A method for establishing communication between a mobile station and a packet data gateway in a point-to-point connection to a packet network including a selection distribution unit interposed between the mobile station and the packet data gateway, the method comprising the steps of:

sending a compressed data packet from the mobile station to a selection distribution unit;

uncompressing the compressed data packet at the selection distribution unit to produce an uncompressed data packet; and

sending the uncompressed data packet from the selection distribution unit to the packet data gateway.

2. A method for establishing point-to-point (PPP) protocol between a mobile station and a packet data gateway in an Internet Protocol (IP) network, the method comprising the step of mapping the PPP protocol onto a first entity and a second entity, the first entity being physically separate from the second entity, the first entity comprising a packet data gateway and the second entity comprising a selection distribution unit.

3. A communication system effective in transporting data packets, the communication system comprising:

a packet data gateway that is effective in sending and receiving uncompressed data packets and compressed data packets;

a selection distribution unit that is effective in receiving uncompressed data packets from the packet data gateway and compressing the uncompressed data packets and sending the resulting compressed data packets to a mobile station in communication with the communication system.

4. A communication system effective in transporting data packets in accordance with claim 3, wherein the selection distribution unit is effective in receiving compressed data packets from a mobile station in communication with the communication system and uncompressing the compressed data packets and sending the resulting uncompressed data packets to the packet data gateway.

5. A method for establishing a link between endpoints in an Internet Protocol network, the Internet Protocol network including a selection distribution unit, the method comprising the steps of:

establishing a link between a mobile station and a packet data gateway, the link including a first link between the mobile station and the selection distribution unit and a second link between the selection distribution unit and the packet data gateway;

indicating that the link between the mobile station and the packet data gateway should send compressed data packets;

determining, at the selection distribution unit, that the first link should send and receive compressed data packets, and the second link should send and receive uncompressed data packets.

6. A method for establishing a link between endpoints in an Internet Protocol network in accordance with claim 5, wherein the step of establishing a link between the mobile station and the packet data gateway comprises the step of establishing a link using the Link Control Protocol.

7. A method for establishing a link between endpoints in an Internet Protocol network in accordance with claim 5, wherein the step of indicating that the link between the mobile station and the packet data gateway should send compressed data packets is initiated by the mobile station.

8. A method for establishing a link between endpoints in an Internet Protocol network in accordance with claim 7, wherein the step if indicating that the link between the mobile station and the packet data gateway should send compressed data packets comprises the steps of:

sending a compression request message from the mobile station to the selection distribution unit; and

receiving the compression request message at the selection distribution unit.

9. A method for establishing a link between endpoints in an Internet Protocol network in accordance with claim 8, the method further comprising the steps of:

sending a message from the selection distribution unit to the packet data gateway indicating that header compression was not requested; and

sending a message from the selection distribution unit to the mobile station indicating that compression request has been accepted.

10. A method for establishing a link between endpoints in an Internet Protocol network in accordance with claim 5, wherein the step of indicating that the link between the mobile station and the packet data gateway should send compressed data packets is initiated by the selection distribution unit.

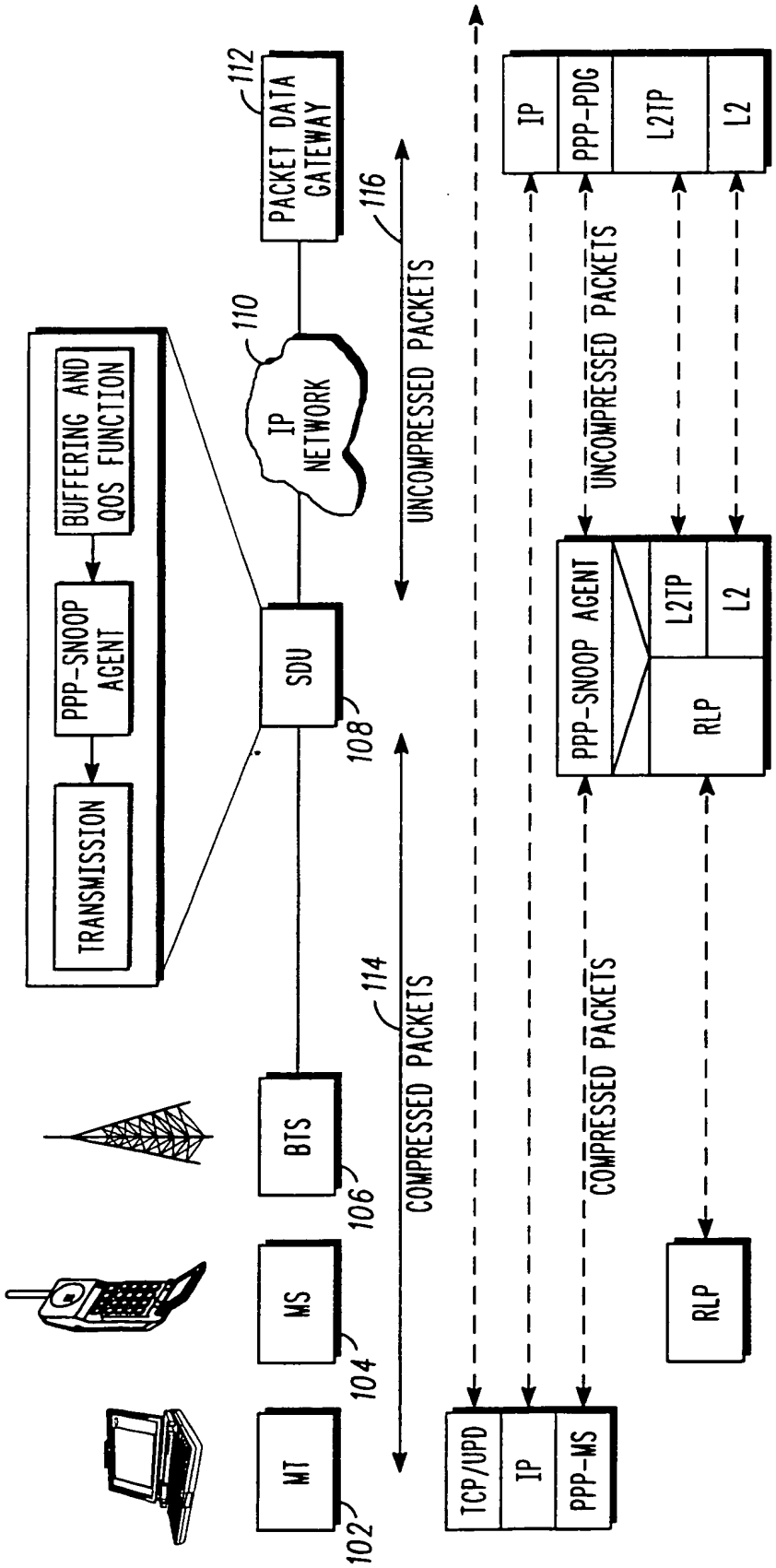

FIG. 1

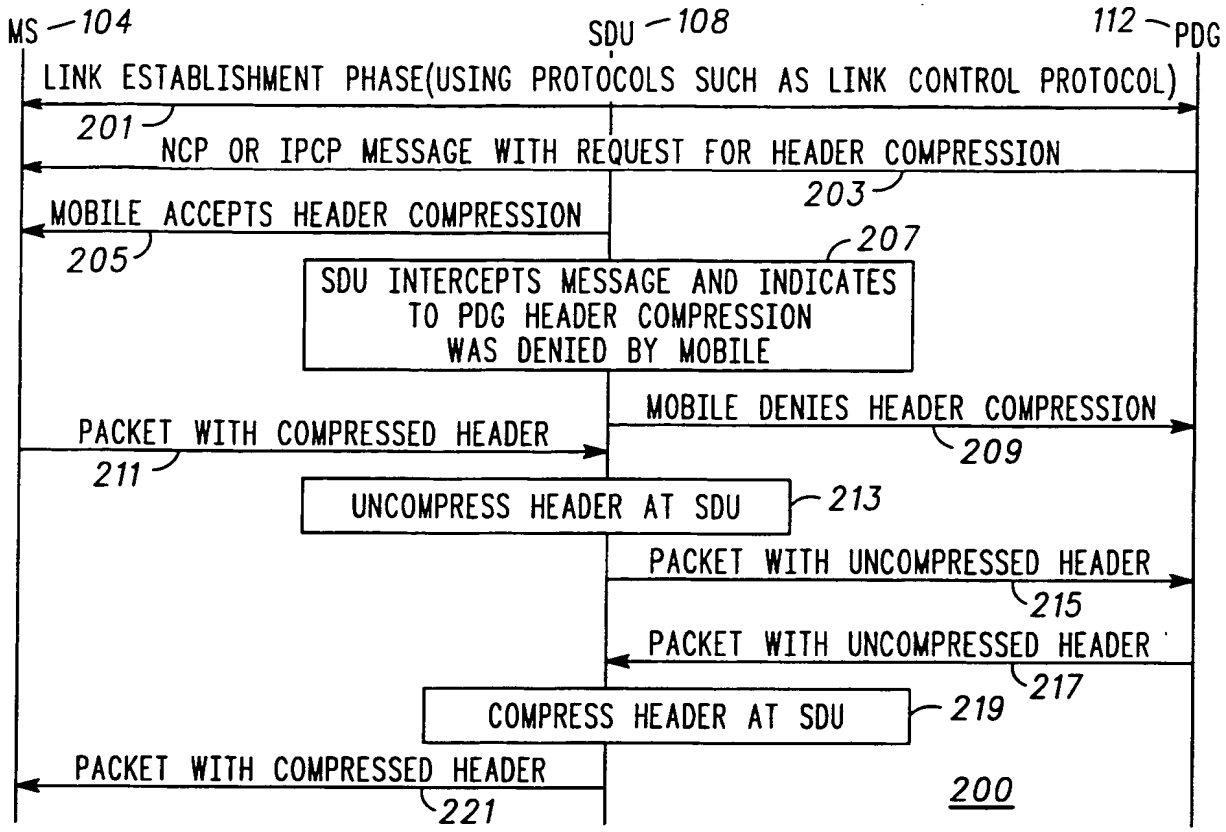

FIG. 2

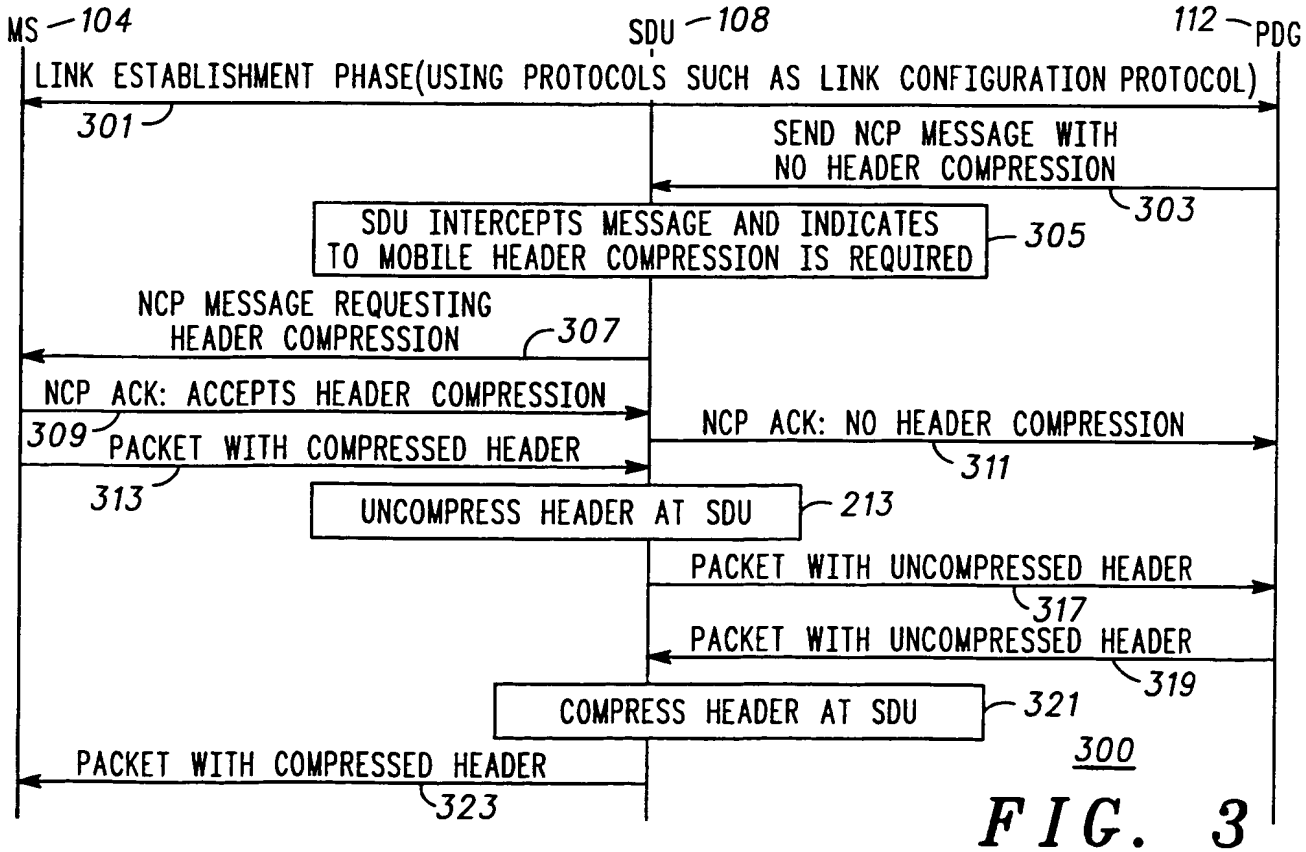

FIG. 3

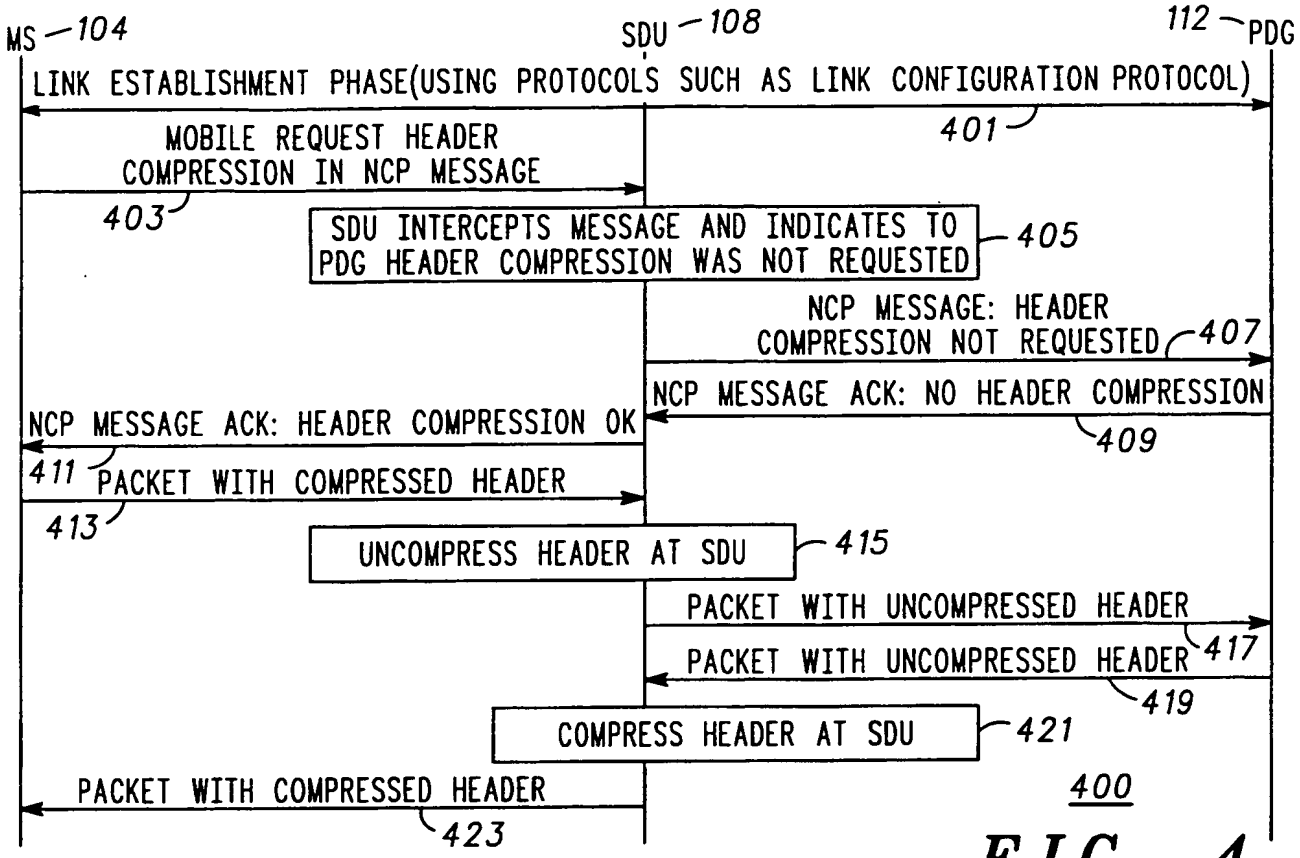

FIG. 4

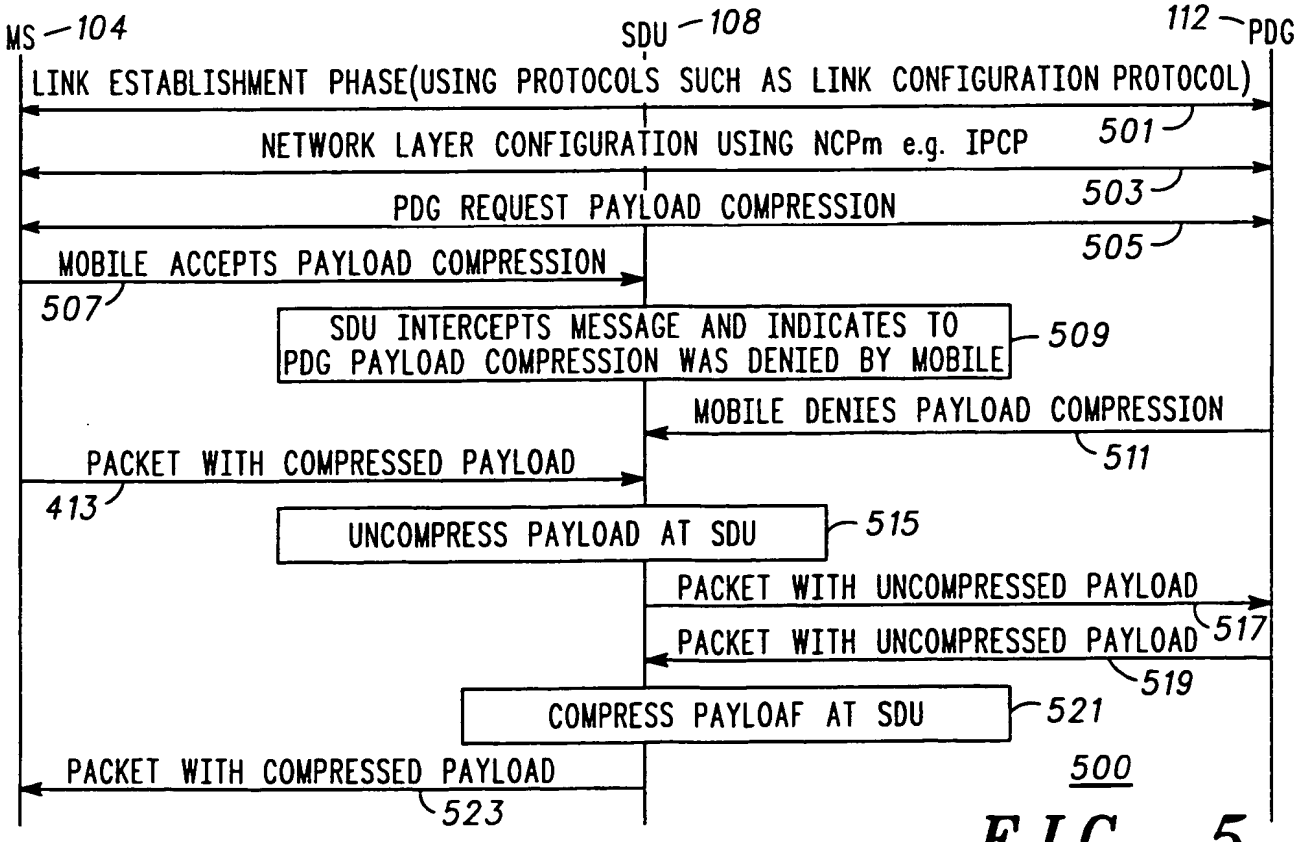

FIG. 5

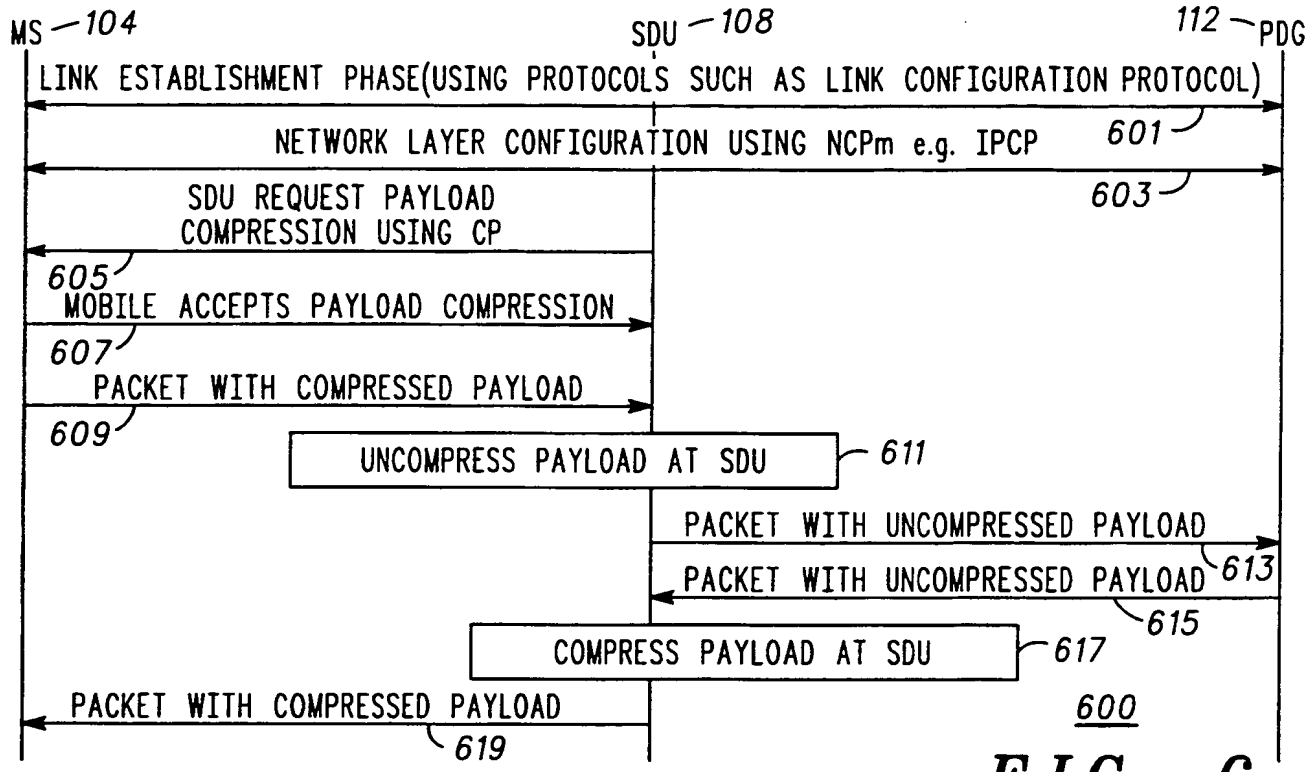

FIG. 6

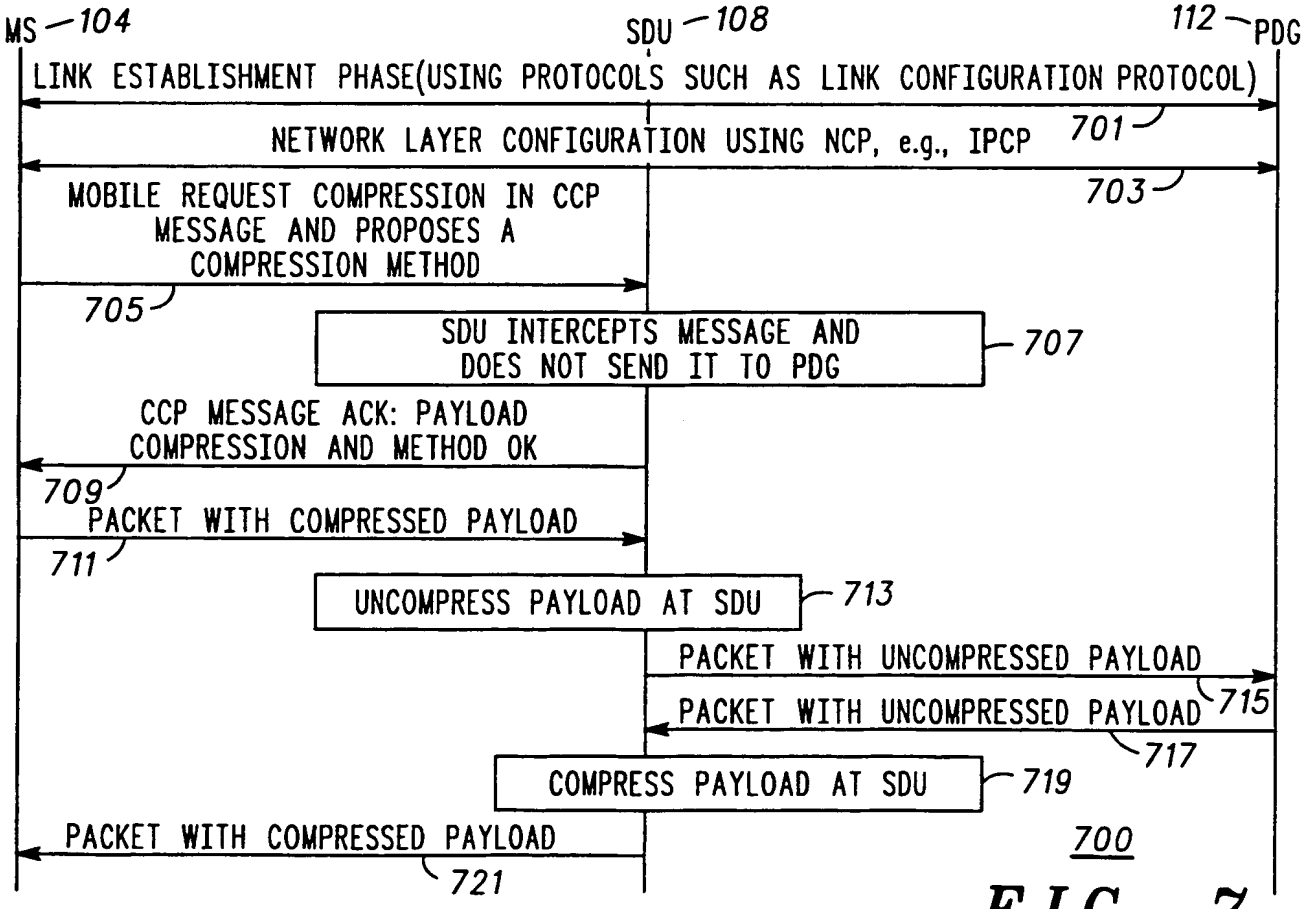

FIG. 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/10522

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) :G06F 13/00
US CL :370/401,466,477
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 370/401,466,477,474,476; 709/226,229,247,249

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WEST:PPP, COMPRESS?, DECOMPRESS?, SDU

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,P	US 5,938,737 A (SMALLCOMB et al.) 17 August 1999, Fig. 2 and column 4, lines 1-11.	1-10
X,P	US 6,058,422 A (AYANOGLU et al.) 02 May 2000, Fig.2 and Fig. 3.	1-10
X	US 5,673,322 A (PEPE et al.) 30 September 1997, Fg. 3 and Fig. 4	1-10
X	US 5,768,525 A (KRALOWETZ et al.) 16 June 1998, Fig. 5.	1-10

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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